

REMARKS

The Office Action of July 2, 2002 has been carefully considered.

Objection has been raised to the amendments previously made to the specification. In order to clarify those amendments, attached hereto are copies of pages 1 and 5 of the specification, with the requested changes made in red ink. Entry of these changes is requested.

Claims 20-31 have been rejected under 35 USC 103 over Papich et al in view of Godinho.

Claim 20 is directed to a method for producing aluminum alloy strip of thickness between 1 and 5 mm. According to this method, an aluminum alloy is cast which consists essentially of at least one element selected from the group consisting of 0.1 to 1.5% Fe and 0.35 to 1.9% Mn, wherein Fe + Mn is < 2.5. The alloy is cast to a thickness of 1 to 5 mm between cylinders comprising a tubular shell shrink-fitted to a cylinder body including cooling means for cooling the shell, and optionally cold rolling the cast alloy. The force applied between the rolls, expressed in tons per meter of width, is less than  $300 + 2000/e$  where e is strip thickness expressed in mm, and the heat exchange between the alloy being cast and the shells is reduced such that shell temperature is  $> 80^{\circ}\text{C}$ . Further, as defined in original Claim 5 of the application,

the strip has, in an as-cast state, a product  $R_{0.2} \times A$  greater than 2500.

Claim 20 has now been amended to recite that the intermetallic phases of the product have an average particle size of no more than 0.4 microns, as originally recited in claim 13 of the application. New claim 32 recites that 90% of the particles have a size less than 1 microns, as originally recited in claim 14 of the application.

The Papich et al reference discloses a method for forming a composite metallurgical product including a roll cast aluminum alloy core and a filler material bonded onto the core. The core material may be an aluminum alloy of the 3000 series, among others, having ranges which overlap with the ranges of the claimed invention. The ultimate object of Papich et al is to form a clad strip, and as shown in Figures 11a through 11h of Papich et al, the cladding step may be performed at the casting rolls, or downstream of the casting rolls. As disclosed at column 10, lines 11 through 13, the force applied by the casting rolls is in the range of 1 to 900 tons/side, or 200 to 1800 tons across the width of the strip. This compares with the range of 700 to 2300 tons across the width of the strip according to the claimed invention, where the strip width is between 1 and 5 mm.

Godinho has been cited for its disclosure of twin roll

casting of aluminum alloys where the surface temperature of the rolls is maintained at 120-200°C.

However, there is no disclosure or suggestion that by combining the cited references, one obtains a product of improved quality, a product in which  $R_{0.2} \times A$  is greater than 2500, resulting from an average size of intermetallic particles no more than 0.4 microns.

Moreover, as previously noted, there is a clear and unexpected advantage to maintaining a force of less than  $300 + 2000/e$  t/m. As shown in Table IV, in each case where the force exceeds the claimed limit, the earing ratio is greater than 7, even where the arc of contact is less than 60 mm. Thus, the claimed limits have been found to be critical to obtain strip of the desired quality.

Accordingly, while the Papich et al reference may suggest varying the force between the rolls and the arc of contact, and Godinho may disclose twin roll casting at the claimed temperature, there is no disclosure or suggestion that the presently claimed critical limitations are necessary for obtaining a product of a desired quality. Withdrawal of this rejection is accordingly requested.

Claims 20-31 have been rejected under 35 USC 103 over Godinho.

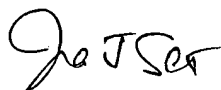
While Godinho broadly discloses casting parameters

according to the invention, there is no disclosure that by combining the parameters one obtains a product with average intermetalllic particle size no more than 0.4 microns, and as a result,  $R_{0.2} \times A$  greater than 2500.

Withdrawal of this rejection is accordingly requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,



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## APPENDIX

### IN THE CLAIMS:

20. (Amended) A method for producing aluminum alloy strip, comprising the steps of casting an aluminum alloy consisting essentially of, in % by weight:

at least one element selected from the group consisting of 0.1-1.5 Fe and 0.35-1.9 Mn, wherein  $Fe + Mn < 2.5$ ;

Si < 0.8;

Mg < 0.2;

Cu < 0.2;

Cr < 0.2;

Zn < 0.2;

other elements < 0.1 each, < 0.3 total;

Al, remainder;

to a thickness of 1 to 5 mm between cylinders comprising a tubular shell shrink-fitted to a cylinder body including cooling means for cooling the shell and optionally cold rolling the cast alloy,

wherein force, expressed in tons per meter of width, is applied to the rolls during said casting which is less than  $300 + 2000/e$ , where  $e$  is strip thickness expressed in mm, and

heat exchange between the alloy being cast and the shells is reduced such that shell temperature is greater than  $80^{\circ}\text{C}$ ,

said strip having in an as-cast state, a product  $R_{0.2} \times A$

greater than 2500, where  $R_{0.2}$  is expressed in MPa and A is expressed in %, and a microstructure comprising intermetallic phases of particles containing at least one of Fe, Mn and Si, having an average particle size of not more than 0.4  $\mu\text{m}$ .